

11-1 Arithmetic Sequences

sequence--list of numbers in a particular order

numbers--terms

arithmetic sequence--sequence in which each term after the first is found by adding a constant to the previous term

constant--common difference (d)

ex:

18, 38, 58, 78, 98, ...

$$d = 20$$

$$a_1 = 18$$

$$a_2 = 38$$

$$a_3 = 58$$

$$a_6 = 118$$

Recursive--find a term using the previous term

$$a_n = a_{n-1} + d$$

Explicit--find a specific term using the first term

ex:

11, 15, 19, 23, 27

$a_1 = 11$

$a_2 = 15$

$d = 4$

$a_2 = 11 + 4 = 15$

$a_3 = 11 + 2 \cdot 4 = 19$

$a_4 = 11 + 3 \cdot 4 = 23$

$a_5 = a_1 + 4d$

$a_6 =$

Explicit formula

n is an integer

$$a_n = a_1 + (n-1)d$$

ex:

12, 5, -2, -9

$a_{10} = 19 - 7(10)$

 a_{50} Find $a_n = a_1 + (n-1)d$

$a_1 = 12$

$d = -7$

$a_n = 12 + (n-1)(-7)$

$a_n = 19 - 7n$

ex:

$a_1 = 23 \quad d = -5$

Find $a_n = 23 + (n-1)(-5)$

Find $a_5 = 28 - 5(5) = 3$

Find $a_{21} = 28 - 5(21) = -77$

Do:

1. Find a_n

-3, -10, -17, -24,...

$$a_n = 4 - 7n$$

$$-3 + (n-1)(-7)$$

$$4 - 7n$$

2. 3, 11, 19,...

Find a_{31} = 243

3. 100, 98, 96,...

Find a_{25} = 52

Arithmetic Mean(s)--term(s) between any two terms in a sequence

ex:

12, 18, 24, 30, 36

18 is the arithmetic mean between 12 and 2424, 30 are the arithmetic means between 18 and 36

ex:

Find 3 arithmetic means between 13 and 29

13, 17, 21, 25, 29

$$a_n = a_1 + (n-1)d$$

$$29 = 13 + 4d$$

$$16 = 4d$$

$$4 = d$$

Do:

Find 2 arithmetic means between 6 and 27

6, 13, 20, 27

$$27 = 6 + (4-1)d$$

$$21 = 3d$$

$$7 = d$$

ex:

$$a_1 = \underline{-8} \quad 16 = a_1 + (4-1)8$$

$$a_4 = 16$$

$$a_7 = 40$$

$$a_n = a_1 + (n-1)d$$

$$40 = 16 + 3d$$

$$24 = 3d$$

$$8 = d$$

Do:

$$a_1 = \underline{-50} \quad 5 = a_1 + 5(11)$$

$$a_6 = 5$$

$$a_9 = 38$$

$$38 = 5 + 3d$$

$$33 = 3d$$

$$11 = d$$

What term is 731?

$$a_n = 731$$

$$n = \underline{72}$$

$$731 = -50 + (n-1)11$$

$$781 = 11n - 50 + 11$$

HW

p581

15-39odd